A Market Development Plan for Recyclable Materials in British Columbia

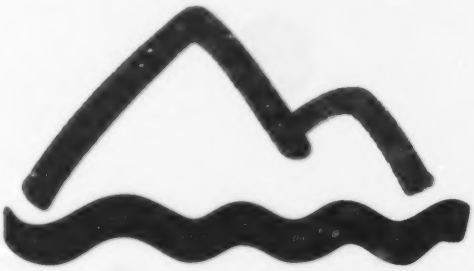
SUMMARY REPORT

prepared for

Municipal Solid and Biomedical Waste Branch
Ministry of Environment
Province of British Columbia

prepared by

Peat Marwick Stevenson & Kellog
and
The Recycling Development Corporation
April 1990



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I

INTRODUCTION

A. PROVINCIAL GOAL IS TO REDUCE WASTE 50% BY THE YEAR 2000

Disposal of municipal solid wastes (MSW) in British Columbia is a growing and serious problem because many landfill sites now used will be filled in this decade. New landfill sites are difficult to locate and can have serious groundwater and air pollution impacts. Increased use of disposable materials not only contributes to the waste management problem but hastens the depletion of our natural resources and uses energy.

The Government of British Columbia recognizes the seriousness of this situation and in an announcement made September 13, 1989 endorsed the Ministry of the Environment's goal to reduce MSW 50% by the year 2000. This goal is to be accomplished through:

- **Reduction** -- waste reduction at its source through legislation and consumer education.
- **Reuse** -- encourage the reuse of waste materials such as refillable beverage containers.
- **Recycling** -- stimulate the supply of recyclable materials and the demand for products with recycled content.

To stimulate recycling, both supply of recovered waste materials and demand for recycled products must be further developed.

B. THIS STUDY OF RECYCLABLE MATERIALS MARKETS IS AN INITIAL STEP

In January, 1990, the Municipal Solid and Biomedical Waste Branch of the Ministry of Environment commissioned Peat Marwick Stevenson & Kellogg and the Recycling Development Corporation to prepare a market development plan for recyclable materials in British Columbia. This study follows from the March 1989 report by the Municipal Solid Waste Management Task Force, chaired by James T. Rabbitt, MLA -- Yale-Lillooet. The task force emphasized recycling as a key component of a solid waste management strategy for British Columbia. This market development plan provides a framework for recommended government initiatives that should enhance and stimulate private sector development in the recycling industry.

The objectives of this study are to:

- Evaluate the existing markets for recyclable materials in British Columbia and identify the key players in the industry.

- Identify areas where the recyclable materials markets need to be developed to achieve the 50% waste reduction goal by the year 2000.

- Describe market development options that will allow the recycling industry to expand profitability to handle increased quantities of recovered waste.

We begin by examining the amount and types of MSW generated in British Columbia and estimate the quantity that is being recovered from the waste stream. We then discuss the current market mechanisms to collect and process recyclable materials in the Province. Each major material type is discussed separately because of the strong differences in market characteristics.

After describing the current market conditions, we discuss a scenario for target recycling rates to achieve the 50% waste reduction goal. We then present various market development strategies to facilitate the market expansion. Finally, we recommend a number of specific actions to expand the level of source reduction, reuse, and recycling in British Columbia.

The recycling industry is an extremely diverse and complex emerging segment of the British Columbia economy. This study is not an exhaustive analysis of waste flows and activities in the recycling industry, but an initial step to identify major market issues and recommend initial market development strategies to increase both the supply and demand for recyclable materials.

C. OUR STUDY METHODS EMPHASIZED CONSULTATIONS WITH INDUSTRY REPRESENTATIVES

In the preparation of this report, we relied on information obtained through:

- Telephone interviews with about 120 participants in various recycling industry sectors.

- Personal interviews with key representatives of certain industries including paper, plastics, metals and glass industries.

- Review of relevant literature provided by the Ministry of Environment and other jurisdictions.

- Meetings with the Inter-Governmental Steering Committee, which included provincial, regional and municipal government representation.

II

WASTE GENERATION AND RECOVERY IN BRITISH COLUMBIA

A. SOME WASTE MANAGEMENT METHODS ARE PREFERRED

A variety of solid waste management methods can be used depending on the type of waste and the waste recovery/recycling/disposal facilities available. Some methods are preferred to others because they are less harmful to the environment. These methods are described in Exhibit II-1.

EXHIBIT II-1
Solid waste management hierarchy

Solid Waste Management Method		Activity
1.	Reduction	Reduce waste through conservation measures such as reduced packaging and consumption.
2.	Reuse	Promote reuse of products, such as beverage containers, in which the material is not remanufactured but used again in its original form.
3.	Recycling:	
	a) First order	Recycle waste for use in same or similar product.
	b) Second order	Recycle waste for use in a different product, usually of lower value.
	c) Third order	Recycle parts of waste products.
4.	Resource recovery	Incinerate waste to produce energy after recovery of recyclable materials.
5.	Incineration	Incinerate waste without recovery of energy.
6.	Landfilling	Deposit waste in a landfill site.

In this study we examine reduction, reuse, and recycling as the primary means of meeting British Columbia's 50% MSW reduction goal. Resource recovery and incineration are not included in the calculations to achieve British Columbia's waste reduction goal. However, these last two methods may be used to reduce landfilled waste beyond the 50% target.

B. BRITISH COLUMBIA PRODUCES 2.4 MILLION TONNES OF WASTE EACH YEAR

About 2.4 million tonnes of MSW are generated each year in British Columbia. This is based on an estimated per capital waste generation rate of 800 kilograms per year. The GVRD estimates that 45% of its wastes are residential and 55% are industrial/commercial/institutional (ICI) wastes. We have assumed that this breakdown is typical of British Columbia as a whole. The waste stream is mainly paper products and organic material as shown in Exhibit II-2.

EXHIBIT II-2
Composition of wastes generated in British Columbia

	Residential Wastes		ICI Wastes		Total Wastes	
Material Type	Tonnes (Millions)	Percent	Tonnes (Millions)	Percent	Tonnes (Millions)	Percent
Paper	0.37	34%	0.55	42%	0.92	38%
Glass	0.08	7%	0.04	3%	0.13	5%
Metals	0.07	6%	0.07	5%	0.13	5%
Plastics	0.10	9%	0.11	8%	0.21	9%
Organics	0.40	36%	0.42	32%	0.82	34%
Other Materials	0.09	8%	0.13	10%	0.22	9%
TOTAL	1.11	100%	1.32	100%	2.43	100%

Source: Adapted from GVRD and Washington State figures.

C. ABOUT 7% OF BRITISH COLUMBIA'S WASTE IS RECOVERED

Wastes recovered from the MSW stream in British Columbia amount to about 170,000 tonnes or 7% of the total waste generated. Exhibit II-3 shows the relative amounts of waste recovered and illustrates that paper is the primary waste recovered. Organic waste comprises a third of the waste stream yet no organized recovery occurs in this waste segment.

Exhibit II-3 demonstrates that there is room for significant growth in recycling. Market development strategies designed to increase recycling rates can substantially reduce the volume of landfilled waste.

EXHIBIT II-3
Quantity of wastes recovered as percentage of total wastes generated

Material type	Total waste generated (000 tonnes)	Total Recovered (000 tonnes)	% Recovered
Paper	920	135	14.7%
Glass	130	15	11.5
Metals	130	8	6.2
Plastics	210	3	1.4
Organics	820	0	0.0
Other Materials	220	9	4.1
TOTAL/AVERAGE	2,430	170	7.0

Source: Estimates provided by industry participants, February, 1990.

Each waste type identified in Exhibit II-3 is discussed in greater detail in Chapter III. Target recycling rates to achieve the 50% waste reduction goal by the year 2000 are suggested in Chapter IV.

D. NUMEROUS BARRIERS TO RECYCLING EXIST

Numerous inhibiting factors have kept recycling a fledgling industry even though substantial opportunities exist. The factors stated below apply to all materials processed in the recycling industry. Issues specific to certain types of waste are dealt with in Chapter III and are not listed below.

- The quality and quantity of recovered waste is inconsistent. This increases the risk for firms in the recycling industry, particularly those firms with high capital costs.
- Markets for recovered and recycled materials are highly uncertain in terms of volumes and prices, therefore little incentive exists to manufacture recycled products.
- Materials recovered from the waste stream often compete with virgin materials that are favoured due to lower prices and higher quality.
- Transportation costs can be prohibitive due to the relatively low value of recovered waste material.

- Processing and remanufacturing infrastructure is not well developed.

- Consumer demand for products with recycled content is not well developed, which leads to uncertain markets as noted above.

- Recycled products are sometimes perceived as inferior by consumers.

- Landfill tipping fees do not reflect the "true" costs of waste disposal, and it can be "cheaper" to send waste to a landfill than to recycle.

- Finding sites for new facilities in metropolitan areas is difficult due to the cost of urban land and zoning laws.

In Chapter V of this report, we make a number of recommendations to overcome these barriers.

III

MARKETS FOR RECYCLABLE MATERIALS IN BRITISH COLUMBIA

A. THE RECYCLING INDUSTRY GENERATES $35 MILLION IN SALES PER YEAR

About 80 organizations in British Columbia participate in the recycling industry, generating about $35 million in sales per year and employing about 1000 people. All materials collected go through two levels of processing: primary processing and secondary processing. At the primary processing stage, materials are cleaned, sorted and baled. At the secondary processing or "remanufacturing stage", materials are made into new end products with recycled content. Only five firms manufacture recyclable materials in British Columbia; the remainder are collectors and primary processors. As a result, a significant portion of recyclable materials are exported after primary processing.

B. PAPER -- THE MOST ESTABLISHED RECYCLING SECTOR

1. About 15% of waste paper is recovered

Recovery of waste paper in British Columbia has increased dramatically during the past few years. Based on our discussions with industry participants, we estimate that about 135,000 tonnes or 15% of waste paper are being recovered in the province. The relative proportions of waste paper recovered are as follows:

EXHIBIT III-1
Quantity of waste paper recovered by material type

	Quantity Recovered in B.C. (tonnes)	Percentage Recovered
Old Newsprint (ONP)	46,000	34%
Old Corrugated Cardboard (OCC)	62,000	46
High Grade Paper	18,000	13
Mixed Waste Paper	9,000	7
TOTAL	135,000	100%

Source: Estimates provided by industry participants, February, 1990.

2. Four firms handle the majority of waste paper

About 25 processors and one major remanufacturer of waste paper operate in British Columbia. Many of them are experiencing very rapid growth rates, especially in the processing of high grade papers. Four firms handle over 90% of the total volume of post-consumer waste paper. These include Paperboard Industries, Canadian Fibre, International Paper Industries, and Weyerhaeuser.

Paperboard Industries is the only major remanufacturer of ONP and OCC in British Columbia. The remanufacture of waste paper requires sophisticated technology because fibre characteristics vary widely between different types of paper and some papers contain chemicals, fillers, and non-wood additives, such as clay, which reduce their recyclability. Paperboard remanufactures OCC and a small amount of ONP is combined with high grade papers to make liner material for gypsum wallboard. Paperboard generally considers ONP a poor source of used fibre and is unlikely to increase its use. Paperboard currently imports OCC and could use more waste generated in British Columbia if it were available at an appropriate price.

Canadian Fibre, International Paper Industries and Weyerhaeuser together with many smaller participants collect and process waste paper. Sorting and baling waste paper that has been recovered from the waste stream is labour intensive. Therefore, this initial processing step is expensive when done in British Columbia. Waste paper is generally exported to the United States or Asia, either before or after it has been processed. Markets for ONP and OCC are international and strongly affected by national and international trends and developments. Over the last five years, economic conditions and demand for paper products have been strong, while prices for virgin market pulp have been very high. Internationally, demand for products made from ONP and OCC remains strong. Growing concerns about solid waste have led to increasing recovery rates for all grades of paper.

3. Barriers and opportunities to paper recycling

Factors that deter waste paper recovery and recycling in British Columbia include:

- The market price for recovered waste paper is low and the processing costs for this labour intensive work are high. Significant volumes of paper waste are required to develop an efficient and profitable sorting and baling operation.

- Paper mills that could potentially use waste paper are typically not situated near urban centres that generate waste paper.

- Current product specifications often preclude the use of waste paper.

- Most pulp mills in British Columbia are not equipped to process post consumer waste paper containing impurities.

- The possible restriction of higher grade recovered paper exports from the United States. Canadian plants may not be able to obtain enough high grade waste paper to supply their recycling operations.

Conversely, new uses for waste paper could substantially increase demand for waste paper. For example, waste paper can be used to produce cellulose insulation, which has higher insulation value than an equal thickness of loose fibreglass or mineral wool. It can also be used effectively as animal bedding because it is more absorbent, durable and gentler to animal skin than straw.

Demand will also rise for magazines and other clay coated papers with the introduction of a new combination washing/flotation recycling process. Two pulp mills in Canada are currently retrofitting their pulping operations to adopt this new technology.

C. GLASS -- ONLY CONTAINERS ARE RECYCLED

1. About 15% of waste glass is recovered

The MSW stream contains about 5% glass, about two thirds of which is glass containers. The remainder is plate glass and ornamental glass. Roughly 13% or 15,000 tonnes of glass waste is recovered from the 130,000 tonnes in MSW. Strong potential exists to reuse glass through the use of refillable glass containers.

About 20 organizations participate in glass recovery and recycling, however the following key players collect, process, and remanufacturer the majority of waste glass. After collection, glass must be carefully sorted and cleaned ("beneficiated") prior to remanufacturing.

2. The glass industry is dominated by four major players

- **Consumers Glass** has the only container glass manufacturing plant in western Canada. Because glass manufacturing plants need to produce large volumes of glass containers to be competitive, western Canada can only support one glass remanufacturer. Consumers Glass reports that it used about 11,000 tonnes of crushed glass ("glass cullet") in 1989.

- **Environmental Technology Ltd.** is a major processor of glass and the only firm besides Consumers Glass operating a beneficiation unit to clean glass before remanufacturing. The company reports that they collected 10,000 tonnes of cullet, of which 6,000 was supplied

to the Consumers Glass plant and the remainder was exported primarily to the western United States.

- **Pacific Brewers Distributors** (PBD) is the distributor of beer containers for the Liquor Distribution Branch. PBD facilitates the reuse and recycling of beverage containers.

- **International Paper Industries** collect glass containers from curbside collection programs that they operate for a number of municipalities in the Province.

3. Barriers and opportunities to glass recycling

Factors that deter glass recycling in British Columbia include:

- High quality clean cullet is required because impurities affect final product quality and can damage a glass furnace. High quality standards mean the processing costs are high, and a specialized beneficiation facility is required.

- Glass cullet has a low price to weight ratio. Therefore it is uneconomical for cullet to be transported long distances.

Possibly the greatest increase in glass recycling could come from extending the existing deposit return system for refillable beer bottles to other glass containers. In Canada, beer containers account for about 14% of all beverage containers, with liquor, wine and soft drink containers making up the remainder. The reuse of these containers would substantially reduce the amount of container glass in the MSW stream.

Because remanufactured glass requires uncontaminated cullet, there are opportunities for new technologies or new products that use recovered waste glass. For example, glass can be added to highway striping paints to make them reflective, to buffing aggregate used for metal work, and used as an aggregate for certain construction materials.

D. METALS -- THE OLDEST RECYCLING SECTOR

1. About 6% of metals are recovered

About 5% (130,000 tonnes) of MSW consists of metals, of which about 6% (8,000 tonnes) is recovered.

Most post-industrial scrap metal is recovered by commercial scrap dealers and does not enter the waste stream. Therefore, the recovery amount stated above does not include post-industrial scrap. Because the post-industrial metal waste recycling industry is

well established, operates relatively efficiently, and does not have a major impact on MSW, it has not been addressed by this study.

Metal recovered from the MSW stream consists largely of used aluminium beverage containers (about 5,000 tonnes are recovered) and to a lesser extent tin cans and other waste metal (3,000 tonnes). While used beverage containers (UBC's) and used tin cans represent only 8% and 22% of total metal waste generated respectively, they are not the most easily recycled.

2. Used aluminum beverage containers - about half are recycled

The recovery of aluminium beverage containers is outlined below.

EXHIBIT III-2
Aluminum beverage containers consumed and recycled in British Columbia

Source	Quantity Used (millions per year)	Empty Weight (tonnes per year)	Quantity Recycled (tonnes per year)	Percent Recycled
Brewery products (PBD)	219[1]	4,138[3]	3,062	74%[1]
Major soft drink distributors (B.C. Soft Drink Assoc.)	150[2]	2,834[3]	1,134	40%[2]
Other soft drink sources, e.g., imports	100	1,888[3]	378	10% (est)
Total/average	469	8,860	4,574	52%

Sources: [1]*Pacific Brewers Distributors.*
[2]*B.C. Soft Drink Association.*
[3]*Assumes 24 containers weigh 0.45 kg.*

The relatively high recovery rate of beer cans can be attributed in part to the deposit return system. Brewers pay a five cent deposit for each aluminium container returned to them. The collection of beer cans from retail outlets is carried out by Pacific Brewers Distributors.

The refund system for soft drink and fruit juice containers is not as effective because the deposit is only charged and received at the retail, not the manufacturer, level. Consequently, the used containers returned to the retailer are often not returned to the

manufacturer or distributor. The retailers may deposit the containers in the waste stream rather than forward them to a recycling facility. Recycled UBC can be used to produce new beverage containers with almost 100% recycled content.

Recovered aluminium beverage containers are generally exported to the United States for remanufacturing.

3. Used tin cans -- about 5% are recycled

Tin can waste is generated primarily by households, commercial food establishments, and commercial painters and decorators (paint cans). Recovery of tin cans from the waste stream is mainly through community and municipal recycling programs. Public participants are required to wash and remove labels from the cans. About 1,500 tonnes or 5% were recovered from the waste stream in 1989.

The recovered cans have two uses:

- They can be sent to a de-tinning plant, where the more valuable tin is separated from less valuable steel.

- They can be sent directly to a steel producer who can tolerate small quantities of tin in his products.

De-tinning is accomplished by washing the cans in a caustic solution. Pure tin is then recovered from the solution by an electrolytic process. Roughly five to six pounds of tin are recovered from a ton of scrap cans. The remaining steel cans are introduced into steel furnaces in the same way as ordinary steel.

Currently, half the tin cans recovered in British Columbia are sent to the only de-tinning plant in the Pacific Northwest, located in Seattle. The other half are sent to steel mills in the United States.

E. PLASTICS -- A DIFFICULT MATERIAL TO RECYCLE

1. Less than 2% of plastics are recovered

About 210,000 tonnes or 9% of MSW in British Columbia is plastic waste. We estimate that only about 2% (3,000 tonnes) are recovered from the waste stream. A small additional amount of unsegregated plastic is recovered as a component of refuse derived fuel (RDF).

Plastic recycling is not well developed in British Columbia for the following reasons:

- Recovery of plastic from the waste stream is expensive and

impractical because extensive sorting is required. Plastic is often mixed with paper or metal in containers and packaging.

- Many types of plastic are hard to identify and segregate.
- Virgin resins are often less expensive and have a higher quality than recycled plastic.
- Recycled plastic is not suitable for use in food containers under current health regulations

In British Columbia, collected waste plastic is primarily soft drink containers made of Polyethylene Terephthalate (PET). About 1,000 tonnes of PET are recycled per year. Another 2,000 tonnes of other plastic are stockpiled or exported to the plastics industry in Asia. Due to the low market demand for post-consumer waste plastic, some stockpiled waste plastic collected through municipal curbside programs, or other collection systems, has virtually no value.

As curbside collection programs expand the waste plastic supply, opportunities to develop new technologies and products using waste plastic will expand. A proposed industry coding program would improve the identification of different resins in waste plastic and allow better segregation.

To increase the recycling rate in British Columbia, a central processing, washing, sorting, baling facility is needed. This type of facility could provide feedstock for new recycling technologies.

New uses for recycled plastics could substantially improve demand. Waste plastics can be recycled into a wide variety of polyester products, such as park benches, plastic pallets, nursery plant pots, traffic cones, wall panels, and so on. It can also be recycled into fibrefill for sleeping bags, pillows, and ski jackets. About 85% of all plastic recycled in the United States is used to make fibrefill.

F. ORGANICS -- STILL AT A RESEARCH STAGE

1. Almost no organics are recycled

Organic waste comprises about a third of MSW (820,000 tonnes) but almost none of this is "recycled" as compost. Significant reductions in landfilled waste can be achieved through organic recycling methods and municipal, regional and provincial governments are very keen to introduce an organized process of organics recycling.

Organic wastes can be broken down into the following categories:

Food waste (kitchen wastes including meats and greens)	50%
Yard waste (grass clippings, leaves, prunings or stumps)	30%
Wood fibre (chips, sawdust, wood debris, and demolition materials)	20%

Composting is the most common method used to recycle organic wastes. Home composting and central facility composting are two major approaches outlined below.

- **Home composting** is easy to implement and ranges from an open compost heap in the corner of a yard, to a specially designed container made of wood or plastic.

- **Central facility composting** can be constructed to process wastes from a large number of residential and commercial sources that participate in an organized collection and transportation system. Two types of central composting facilities are the **In-Vessel** and the **Open Air Composting** methods.

2. In-Vessel Composting -- pilot project conducted in British Columbia

A pilot project in the Powell River Regional District tested the technical and economic viability of the **In-Vessel** organic composting process. The process involves a "digestor", which is a tunnel reactor about 10 metres long and by 2 metres high. Yard and food waste, together with wood chips used as a bulking agent, are fed into the digestor. The fermentation process involves adjustments in temperature, moisture, oxygen and acidity levels to promote optimum bacterial reaction. It takes three to four weeks to produce a relatively high quality compost. The Powell River project produced compost that met Agriculture Canada's application guidelines. A drawback of this approach is the high capital cost.

3. Open Air Composting -- not conducted in British Columbia

Open air composting is the more common of the two centralized composting methods. The method is popular in the United States and several operations exist in Canada (although none in British Columbia).

Organic wastes are moistened to a specified level and placed in "windrows" that are turned regularly to aerate the material. Compost is produced in five to seven weeks depending on the weather conditions. High amounts of rainfall prolong the composting time. This could pose a problem in certain areas of British Columbia. Also, concerns about odours and leachates further reduce the attractiveness of this option.

Open air composting requires a significant amount of land space although the capital cost of equipment is less than for the in-vessel composting method.

The quality of compost produced by the method described above is often not adequate for silviculturist use. However, even if the material can only be used for landfill cover, the composting process significantly reduces the total volume of waste

material. Many municipalities operate composting programs simply to reduce waste volume, not to create a marketable product.

4. Barriers and opportunities for composting

Composting is considered an industrial activity in British Columbia and therefore not permitted on agricultural land. This legislation effectively prohibits open-air composting because industrial land is too expensive for this purpose.

Wood waste products such as animal bedding, and compressed fire logs exist in the market place but are not well established because more suitable and less expensive raw materials are available. The hog fuel market appears to offer the greatest potential for wood waste. The forest products industry is a well established user of hog fuel. The chief constraint to recovery is transportation costs from sources to end users. Also, the market for hog fuel is dependent on the cost and availability of alternate forms of energy.

There is a potential to significantly reduce MSW by encouraging home composting and implementing central composting facilities in locations where they are economically and environmentally feasible.

G. OTHER RECYCLABLE MATERIALS REQUIRE INDIVIDUAL ATTENTION

"Other materials", including hazardous wastes and hard to dispose of items, make up about 9% or 220,000 tonnes of MSW in British Columbia. About 9,000 tonnes of these materials are recovered from the waste stream and include oil, rubber, batteries, paints and thinners, and household appliances. Each material type is described briefly below.

About 95 million litres of oil are sold annually in British Columbia, of which about 10 million litres of recycled oil is produced. All of the recycled oil is produced at a used lubricating oil refining plant operated by Mohawk Oil Company in British Columbia. About 60% of Mohawk's reprocessed oil is sold in the United States while the remainder is marketed in western Canada.

About 5,400 tonnes of waste rubber are used by two British Columbia firms, to produce about 100,000 rubber mats annually. Rubber buffings from retread operations are the primary source of supply supplemented by rubber ground from car tires. About 60% of the mats are sold in the United States, while the remainder are sold in Canada.

About 90% of all batteries in North America are recycled and this percentage is probably similar for British Columbia. About 70% of all batteries are used in automobiles, while the remainder are used in other transportation vehicles. Only two battery processors operate in British Columbia; one in Vancouver and one in Fruitvale in southeastern British

Columbia. The lead and lead alloy recovered from the batteries are sold to battery manufacturers or smelters, while the waste plastic is exported to the United States through recycling processors.

Only one firm, Allure Industries, processes waste paint and solvents in British Columbia. It processes about 180,000 litres per month of contaminated solvents and other paint related waste. Markets for the processed material are primarily local, although some is exported to the northwest United States.

About 100,000 new refrigerators and freezers are sold each year in British Columbia of which about one quarter are subsequently reused as second-hand appliances. Less than 500 refrigerators are recovered each month in British Columbia, although some of these are repaired and resold. Recycling of appliances typically involves stripping the aluminum, copper, steel, and plastic parts and then removing the freon.

IV

FUTURE MARKET POTENTIAL FOR RECYCLABLE MATERIALS

A. FUTURE REDUCTION, REUSE AND RECOVERY RATES VARY BY MATERIAL TYPE

Each category of recyclable materials is affected by widely differing market forces, which strongly affect the future potential to reduce, reuse and recycle these materials. In Exhibit IV-1, we have rated the major material types according to the future potential to which they can be source reduced and reused or recycled. These ratings, which are based on recent trends in British Columbia and other jurisdictions as well as discussions with recycling industry participants, are further explained below.

EXHIBIT IV-1
Potential to increase source reduction, reuse and recycling rates for recyclable materials

Material type	Potential to increase Source reduction and reuse rate	Potential to increase recycling rate
Paper	Moderate	High
Glass	High	High
Metals	Low	Moderate
Plastics	Low	High
Organics	High	Moderate

Potential to source reduce paper will be moderate. While new office practices will permit better conservation of high grade paper, consumption of newspapers is unlikely to decline. Moderate potential exists to source reduce old corrugated cardboard grades through reduced packaging. Fortunately, the potential is high to increase recycling of all paper grades through blue box programs and office recycling programs.

Potential is high to reuse glass containers, which comprise over 70% of total glass production. Expansion of beverage container legislation to include a broader range of glass containers as well as efforts to increase the proportion of refillable containers will be the primary driving force behind this. Strong potential also exists to increase the recycling rate

for glass containers after reuse.

Future potential to source reduce metals will likely remain poor, except through general efforts to reduce packaging. We have rated the future recycling potential for metals as moderate because while certain types of metals such as aluminum and tin cans will enjoy high recycling rates it will continue to be difficult to recycle multi-metal items such as appliances.

As with metals, the potential to increase source reduction rates for plastics will be poor. Efforts to reduce packaging will likely only offset the dramatic rise in plastics use for non-packaging. Future plastics recycling will be moderate because even though plastics will be accepted by curbside and drop-off collection programs, technological difficulties in identifying and separating multi-plastic materials will exist.

Potential to source reduce organics will likely be higher than for any other material type as single family dwellings across the province establish backyard composting bins. Recycling of organics through centralized composting systems will increase moderately as the combination of food, wood, and yard wastes will produce only a low value compost material.

B. ONE SCENARIO OF FUTURE WASTE GENERATION AND RECYCLING RATES IN THE YEAR 2000

British Columbia has set a target of 50% reduction in MSW to be achieved by the year 2000. This can be accomplished through both reduction in waste generated and recycling. Based on discussions with industry participants, we developed a waste simulation model and considered one possible scenario for waste reduction and increases in recycling to meet the target. The model indicates that if population growth, waste trends and recycling rates continue, the waste generated in British Columbia would be 2.78 million tonnes in the year 2000. Therefore, we have assumed the target waste generated to be half that amount, or 1.39 million tonnes. This level of waste generation could be achieved by:

- Reducing per capita waste reduction from 800 kilograms per year to 600 kilograms per year.

- Increasing the overall recycling rate from 7% to 32%.

Exhibit IV-2 describes how the waste generation and recycling rates for the various material categories could change between 1989 and the year 2000 to achieve the target objective.

EXHIBIT IV-2
Current and target recovery and source reduction rates

Material Type	Current Waste Generation Rate 1989	Target Waste Generation Rate 2000	Current Recycling Rate 1989	Target Recycling Rate 2000
	(per capita kilograms per year)			
Paper	300	220	15%	50%
Glass	40	40	13	40
Metals	40	40	7	14
Plastics	70	60	1	15
Organics	270	170	0	24
Other Materials	80	70	4	40
Total/Average	800	600	7%	32%

We have assumed that paper consumption will be reduced by 80 kilograms per person per year, primarily through reduced packaging and reduced use of disposal paper. We do not foresee any significant reduction in the quantity of glass and metals consumed. Plastics should be source reduced in the same manner as paper, however we have assumed a smaller decrease because the reduction must displace current growth in plastics consumption.

Most of the source reduction is expected to be achieved by removing organics from the waste stream through home composting. By the year 2000, about 100 kilograms per person year will need to be diverted from the waste stream by this method.

Paper recycling will be encouraged by the presence of office building recycling programs and the municipal collection of old newspapers and other papers. The proportion of glass recycled will increase, partly because plastic and aluminum containers will be substituted for glass containers. We have also assumed the amount of metal recycled will double because of the increased collection of beverage containers and tin cans. We have assumed that over the next decade new technologies and sorting techniques will increase the plastic recycling rate. At the present time very little organic waste is being composted. By the year 2000, we have assumed that 24% of organic waste entering the waste stream will be recycled by municipal and commercial composting programs.

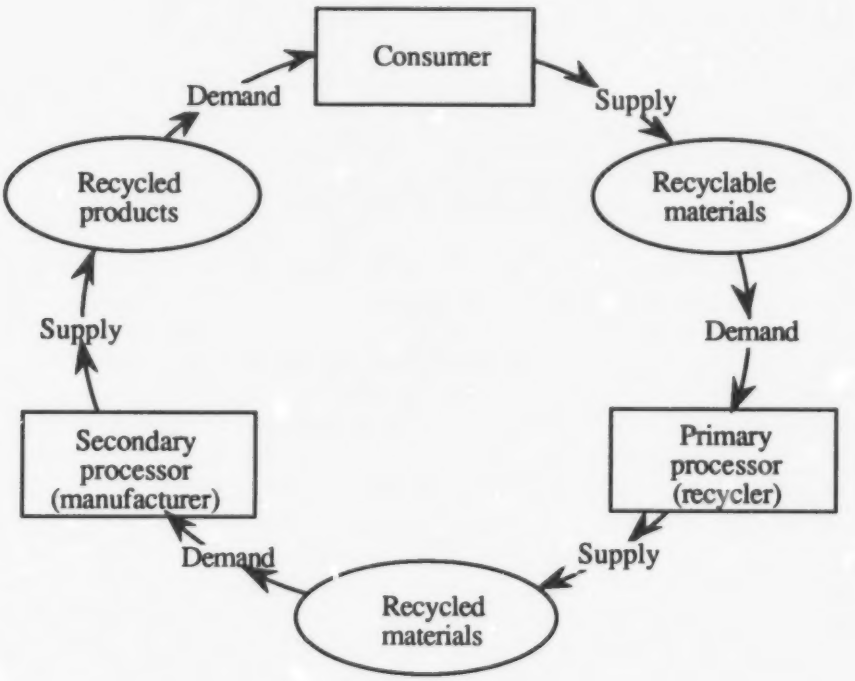
V

MARKET DEVELOPMENT STRATEGIES TO EXPAND RECYCLING

A. MARKET DEVELOPMENT CONCEPTS

An increase in recycling rates to achieve the target rates set out above depends on increasing demand and supply of recovered material, recycled materials and products as illustrated in the diagram below.

EXHIBIT V-1
The recycling loop



Both supply shortages and low demand for waste materials and recycled products inhibit the growth of recycling. Market development designed to increase volume on both the supply side and demand side should "close the loop".

B. ACTION PLAN

The action plans outlined in this section were identified through our research about recycling programs in certain states and provinces and also through discussions with industry participants and steering committee members. Some recommendations can be implemented immediately; others, particularly the legislation-related activities are complex and require longer lead times for development. These activities particularly require benefit/cost evaluation to ensure that the social and economic benefits exceed the social and economic costs.

1. Attract business through financial incentives

Many sectors of the recycling industry are not yet attractive to private sector participants because the market is not sufficiently developed to provide profitable reasonable business opportunities. Financial incentives can serve as a catalyst to business development to facilitate the entry of private sector participants into the recycling business. Ideally, financial incentives should not be a permanent fixture in the recycling industry, but can help to develop the market initially.

Action

- Implement a program of business development loans to assist recycling businesses with capital expenditures.
- Initiate a program of accelerated capital cost allowances or investment tax credits for recycling facilities and equipment.
- Implement a grant program aimed specifically at supporting research into the development of products and technology needed to process and use recycled materials.

2. Create public awareness and educate

A well informed marketplace is an essential part of an efficient recycling sector. Some specific actions that will increase the recycling sector through public awareness, are described below:

Action

- Promote the use of blue box programs and recycling depots through a specific campaign targeted at consumers.
- Use government publications to increase public awareness about actions they can take to reduce, reuse, and recycle waste.
- Support and promote the "eco-logo" certification program for

environmentally sound products as developed by Environment Canada.

- Specifically encourage home composting.

- Build on work being done through the education system to strengthen environmental consciousness among school children.

- Provide speakers and workshop coordinators to any group wanting to learn more about the role consumers play in recycling.

- Establish a telephone information hotline with a supporting computer database to answer consumer questions about recycling and provide business related contacts within the recycling industry.

3. Set an example with procurement policies

Active procurement of recycled products by purchasing authorities at various levels of government will substantially increase demand for recyclable materials. The British Columbia Purchasing Commission has established preference criteria for recycled paper. The Commission and other purchasing organizations should pursue actions as presented below:

Action

- Identify a list of products containing recycled materials that can reasonably be supported through procurement activities. In addition to paper and oil, the list could include:

  - Retreaded tires.
  - Asphalt containing recycled rubber.
  - Concrete containing fly ash.
  - Cellulose insulation.

- Establish testing procedures to determine the physical acceptability of products to be procured.

- Review specifications to ensure that products containing recycled materials are appropriately qualified.

- Establish modest, short term price preferences for products containing recycled materials.

- Create a directory of firms offering recycled products, for use by persons calling for tenders.

- Require tenderers for all products to specify the percentage content of recycled material and favour those with high recycled content.

- Coordinate material specifications and procurement practices between all purchasing authorities.

4. Extend the deposit refund system

A deposit system applied to a wider range of packaging materials and products will achieve the following:

- Reduce the volume of waste going to landfill.

- Reduce the consumption of renewable and non-renewable resources.

- Encourage reuse and recycling by consumers.

Action

- Extend the deposit refund system to wine and liquor bottles and other glass and aluminum containers not covered by existing legislation.

- Make it feasible for the containers to be collected in a central location so that they can easily be recycled.

- Initiate a deposit refund system for tires and batteries.

5. Coordinate regional recycling efforts

The recycling markets will become more developed if the Province of British Columbia cooperates with other jurisdictions, such as neighbouring states, neighbouring provinces, municipalities and regional districts.

Action

British Columbia and the State of Washington jointly form the Pacific Northwest Economic Partnership, established to promote products and develop business opportunities for the region. To date, this partnership has not been involved in recycling. Nevertheless, we recommend that the Partnership:

- Develop a shared regional information management system relating

to the recycling industry.

- Sponsor seminars and conferences to advance knowledge about new recycling technologies, procedures and programs.

- Conduct joint feasibility studies for public and private sector organizations involved in processing and marketing recyclable materials.

- Develop a coordinated marketing plan with cross-jurisdictional interests.

- Share information about current and proposed legislation to to ensure complementary regulations in the region.

- Share information about major capital investment projects, especially those that require guaranteed sources of supply from both regions. Establish reciprocal agreements for the supply and purchase of recyclable and recycled materials.

Alberta is in the process of releasing its Comprehensive Waste Minimization and Recycling Program. British Columbia and Alberta can cooperate in the following ways:

- Develop a consistent philosophy on recycling and waste disposal in general.

- Develop joint legislation to facilitate trade in recyclable materials and recycled products between the two provinces.

- Invite Alberta to participate in the shared regional information management system for the recycling industry.

- Sponsor joint seminars and conferences and develop coordinated marketing plans.

With regard to municipalities and regional districts, we recommend the Ministry of Environment convene annual meetings of environmental officials and recycling representatives in each jurisdiction. At these meetings, the Ministry would:

- Explain its plans and policies.

- Learn about local government programs and policies.

- Develop coordinated approaches to regulating and processing

recyclable materials and recycled products.

6. Legislate minimum recycled content

Legislation can be a powerful tool to stimulate recycling. For example, legislating minimum quantities of recycled material in newsprint in certain states has created sufficient product demand to allow the private sector to make long term investments in the equipment and infrastructure to recycle paper.

Action

- Actively seek recycled materials for which a minimum recycled content could be achieved. For example, the use of recycled rubber products in asphalt or waste glass as aggregate for certain construction materials.

7. Ban disposal of specified materials

Consider disposal bans for certain products. For example, many landfill sites refuse to take such items as waste gypsum. Before a long list of banned products can be issued, alternative disposal systems must be developed. Bans will otherwise merely lead to illegal dumping, which is worse than the present situation. Given that simultaneous attention is paid to alternative disposal methods, the following actions should be taken:

Action

- Develop lists of products suitable for extraction from the conventional waste stream. These could be products with existing markets and collection systems such as newspapers. They could include non-biodegradable products such as tires and plastics. Specific products can only be identified after further investigation.

- Prohibit the use of undesirable materials in certain products manufactured and used in British Columbia. Specific products and materials can only be identified after further investigation.

- Develop a list of undesirable materials, the banning of which would improve the environmental health of the province. Examples include the use of such materials as chlorofluorocarbons (CFC), multi-material packaging that cannot be recycled, and so on. Specific materials would be identified by technical experts.

- Cooperate with governments in other jurisdictions to minimize disposal problems associated with nationally distributed products.

C. FUTURE RESEARCH NEEDS

Information is critical to making informed decisions about managing of MSW in British Columbia. In this study, we focussed on recycling activity in British Columbia and the role that market development can play in enhancing recycling of wastes and reducing MSW disposal through incineration or landfill. During the course of this study, we became aware that very little information was available in certain key areas. Further research and investigation would allow better waste management choices to be made in the future. The research should include:

- Conducting a comprehensive waste audit to determine the amount, source and type of waste currently generated in British Columbia.
- Determining current levels of recycling.
- Calculating the "true" waste disposal costs for landfilling and incinerating.
- Compiling recyclable materials export/import data.
- Investigating the relationship between waste weight and volume.

In conclusion, the markets for recyclable materials in British Columbia appear to be fairly strong. However, it is only through dedicated action and continued research that the 50% waste reduction goal will be met.